

REMARKS

Claims 1, 3, 8-10, 15, 19, and 20 are rejected under 35 USC 103a as being obvious over Fukumoto et al. (US 6493296) in view of Kojima et al. (US 2002/0001282)

Applicant respectively asserts that claims 1, 3, 8-10, 15, 19, and 20 should not be
5 found rejected under 35 USC 103a as being obvious over Fukumoto et al. in view of Kojima et al. because Kojima et al. and Fukumoto et al. do not teach, either alone or in combination, all of the limitations of claims 1, 3, 8-10, 15, 19, and 20. Additionally, applicant asserts there is no motivation to combine the teachings of Kojima et al. with those of Fukumoto et al.

Firstly, applicant respectively asserts that Kojima et al. and Fukumoto et al. do not
10 teach, either alone or in combination, at least the following feature as claimed claim 1 of the application:

“when controlling the tilt servo to adjust the tilt angle between the optical disc
and the object lens according to the DPD signal, the tilt search block finding
an optimal tilt angle having a lowest amplitude DPD signal.” (from claim 1)

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In the Office action dated 03/02/2007, the Examiner stated, Fukumoto “does not control the tilt to the angle having the lowest amplitude DPD signal”, but “Kojima et al. teaches controlling the tilt to the angle having the lowest amplitude DPD signal (fig 4 and see paragraphs 41 and 42)”; however, the applicant respectfully disagrees. In particular, applicant
20 notes that paragraphs 41 and 42 by Kojima et al. state that Figure 4 is an illustration of wave front aberration at a fixed tilt angle of 0.6 degrees. Specifically, paragraph [0041] by Kojima et al. states, “a distribution of wave front aberration of a DVD with a tilt value of 0.6 degrees and a distribution of wave front aberration after the tilt correction by the liquid crystal element according to the invention, are shown.” The wave front aberration shown in Figure 4
25 is not equivalent to the DPD signal, as is claimed in the invention. In particular, Kojima et al. states, “It is noted that the abscissa indicates a radial distance from the center (0mm) to the outer periphery of the objective lens, and the ordinate indicates the phase difference.” In other words, the horizontal axis of Figure 4 represents the radial distance from the device to the

lens, and the vertical axis represents the phase difference of the wavefront aberration.

However, the differential phase detection signal (DPD signal) of the invention is defined in paragraph [0020] as “The DPD signal is a common signal required in optical disc systems and the DPD signal generator 108 generates this DPD signal according to the output
5 of the OEIC 106”. Additionally, paragraph [0021] describes Figure 2 of the invention illustrating the DPD signal generator 108. Applicant notes that the phase difference of the wavefront aberration described by Kojima et al. is not equivalent to the DPD signal of the invention because the Kojima et al. teaches generating the phase differences differently than the invention teaches generating the DPD signal. For example, in paragraph [0039], Kojima
10 et al disclose “The correction for the tilts of the high density optical disc can be made by phase differences caused by light beams transmitted through the nine zones, and the correction for the tilt of the low density optical disc can be made by phase differences caused by light beams transmitted through the zones 1, 2, 3, 4, 4 within the circular beam for the low density optical disc.” The zones mentioned by Kojima et al. are shown in Figure 2 and are
15 clearly different than the OEIC 106 of the invention. For at least this reason, applicant asserts that Kojima et al. do not teach or suggest controlling the tilt according to the DPD signal as is claimed in claim 1 of the invention. (emphasis added)

Additionally, applicant points out that Kojima et al. also do not teach or suggest “controlling the tilt to the angle having the lowest amplitude DPD signal.” Even assuming the
20 wave front aberration shown in Figure 4 by Kojima et al. is a DPD signal, which is clearly not the case as described above, applicant notes that nowhere does Kojima et al. teach to control the tilt to the angle having the lowest amplitude (DPD) signal. Instead, applicant firstly notes that the tilt correction by the liquid crystal element method of Kojima et al. does not involve changing the tilt angle at all. Paragraph [0040] of Kojima et al. states, “a tilt caused in the
25 optical system can be reversely corrected by carrying out the proportional correction for the applied voltage in accordance with a tilt degree.” Applicant also notes that in paragraph [0041] Kojima et al. state that the tilt value is fixed at 0.6 degrees in their example of Figure 4, “a distribution of wave front aberration of a DVD with a tilt value of 0.6 degrees and a

distribution of wave front aberration after the tilt correction by the liquid crystal element according to the invention, are shown.” Therefore, Kojima et al. do not teach the tilt search block finding an optimal tilt angle having a lowest amplitude DPD signal, as is claimed in claim 1 of the invention. (emphasis added) In fact, Kojima et al. only account for a tilt angle
5 and do not try to correct it.

Secondly, in paragraph [0042], Kojima et al. state, “The ideal phase difference is exhibited by a flat curve having a 0nm. As shown in the figure, a remarkably improved effect for the phase difference can be seen in the center part and the peripheral part of the objective lens.” Applicant notes that a flat curve of the phase difference at 0nm is not equivalent to the
10 angle having the lowest amplitude DPD signal, as is claimed in claim 1 of the invention. For example, clearly Figure 4 of Kojima et al. also shows other lower than 0nm values of the wave aberration phase difference that are away from the center and peripheral parts of the figure. As taught by Kojima et al., these values are not ideal because they are not exactly 0nm. However, as claimed in the invention, the tilt search block finds an optimal tilt angle having a
15 lowest amplitude DPD signal. Therefore, in addition to the above described reasons of Kojima et al. not controlling the tilt angle, and not controlling the tilt angle according to the DPD signal, applicant also asserts that claim 1 of the invention should not be found rejected under 35 USC 103a as being obvious over Fukumoto et al. in view of Kojima et al. because Kojima et al. does not teach finding an optimal tilt angle having a lowest amplitude DPD
20 signal, as is claimed in claim 1 of the invention. (emphasis added)

Similar arguments also apply to independent claims 8, 19, and 20 of the invention.

Applicant also asserts that there is no motivation for a person skilled in the art to combine the teachings of Kojima et al. with those of Fukumoto et al. to result in the invention
25 without further inventive process. The Examiner stated in the Office action of 03/02/2007, “At the time of invention it would have been obvious to provide the apparatus of Fukumoto et al. with phase correction of Kojima et al. because it would reduce the number of parts necessary to carry out tilt control.” However, the applicant respectfully disagrees because the

principle of operation of Kojima et al. is in contrast with carrying out tilt control.

Concerning the lack of motivation to combine the teachings of Kojima et al. with those of Fukumoto et al., applicant points out that Fukumoto et al. is directed at utilizing a servo to correct the angle of the pickup head. This is described by Fukumoto et al. in col 8, lines 15-19 stating, "The controller corrects the tilt angle by means of a tilt angle correction unit in the servo unit." Such principle of operation is directly in contrast to Kojima et al. who teach utilizing the liquid crystal element to reversely correct tilt. This is described by Kojima et al. in paragraph [0040] stating, "the voltage applied to the liquid crystal is subjected to proportional control in accordance with a tilt value so that a tilt caused in the optical system is reversely corrected. Since the increased refractive index equivalently causes an increase in the optical path length, a tilt caused in the optical system can be reversely corrected by carrying out proportional correction for the applied voltage in accordance with a tilt degree."

Applicant asserts that the principle of operation of Fukumoto et al. (i.e., utilizing a servo to perform tilt angle correction) and the principle of operation of Kojima et al. (i.e., changing refractive index of liquid crystal to reversely correct for a tilt) are not equivalent or similar to each other and therefore there is no motivation to combine said references. For example, there is no servo unit disclosed in Kojima et al. and Kojima et al. does not teach correcting the actual tilt angle so therefore the teachings of Kojima et al. are not compatible with those of Fukumoto et al. because Fukumoto et al. relies on a servo in order to correct the actual title angle. In this way, applicant respectfully disagrees with the motivation stated by the Examiner in the Office action of 03/02/2007 because the teachings of Kojima et al. are not applicable to carrying out tilt control. Tilt is simply not controlled by teachings of Kojima et al.

In summary, for at least the reasons:

1. Kojima et al. and Fukumoto et al. do not teach, either alone or in combination, "when controlling the tilt servo to adjust the tilt angle between the optical disc and the object lens according to the DPD signal, the tilt search block finding an optimal tilt angle

having a lowest amplitude DPD signal” as is claimed in the invention; and

2. there is no motivation to combine the teachings of Kojima et al. with those of Fukumoto et al.

withdrawal of the 35 USC 103a rejections of claims 1, 8, 19, and 20 is respectfully
5 requested. Claims 2-3, 5-7; and 9-10, 12-18 are dependent upon base claims 1 and 8,
respectively, and should therefore be allowable for at least the same reasons.

Claim 2 is rejected under 35 USC 103a as being unpatentable over Fukumoto et al. and Kojima et al. in view of Scheffler (US 5021893)

10 Claim 2 is dependent upon currently amended claim 1, which is believed allowable by the applicant for at least the above stated reasons; therefore, claim 2 should also be found allowable for at least the same reasons because it is dependent upon claim 1. Withdrawal of the 35 USC 103a rejection of claim 2 is respectfully requested.

15 **Claims 5-7 and 12-14 are rejected under 35 USC103a as being unpatentable over Fukumoto et al. and Kojima et al. in view of Gleim (US 4888754)**

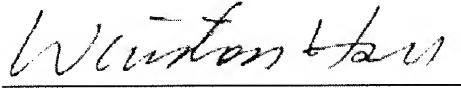
Claims 5-7 and 12-14 are dependent upon claims 1 and 8, respectively, which are believed allowable by the applicant for at least the above stated reasons; therefore, claims 5-7 and 12-14 should also be found allowable for at least the same reasons. Withdrawal of the 35
20 USC 103a rejection of claims 5-7 and 12-14 is respectfully requested.

Conclusion:

Thus, all pending claims are submitted to be in condition for allowance with respect to the cited art for at least the reasons presented above. The Examiner is encouraged to
25 telephone the undersigned if there are informalities that can be resolved in a phone conversation, or if the Examiner has any ideas or suggestions for further advancing the prosecution of this case.

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Sincerely yours,



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Winston Hsu, Patent Agent No. 41,526

5 P.O. BOX 506, Merrifield, VA 22116, U.S.A.

Voice Mail: 302-729-1562

Facsimile: 806-498-6673

e-mail : winstonhsu@naipo.com

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